

California LOS ANGELES MUTUAL AID STUDY



National Fire Coordination Study



U.S. DEPARTMENT OF AGRICULTURE / FOREST SERVICE / DIVISION OF FIRE CONTROL

California

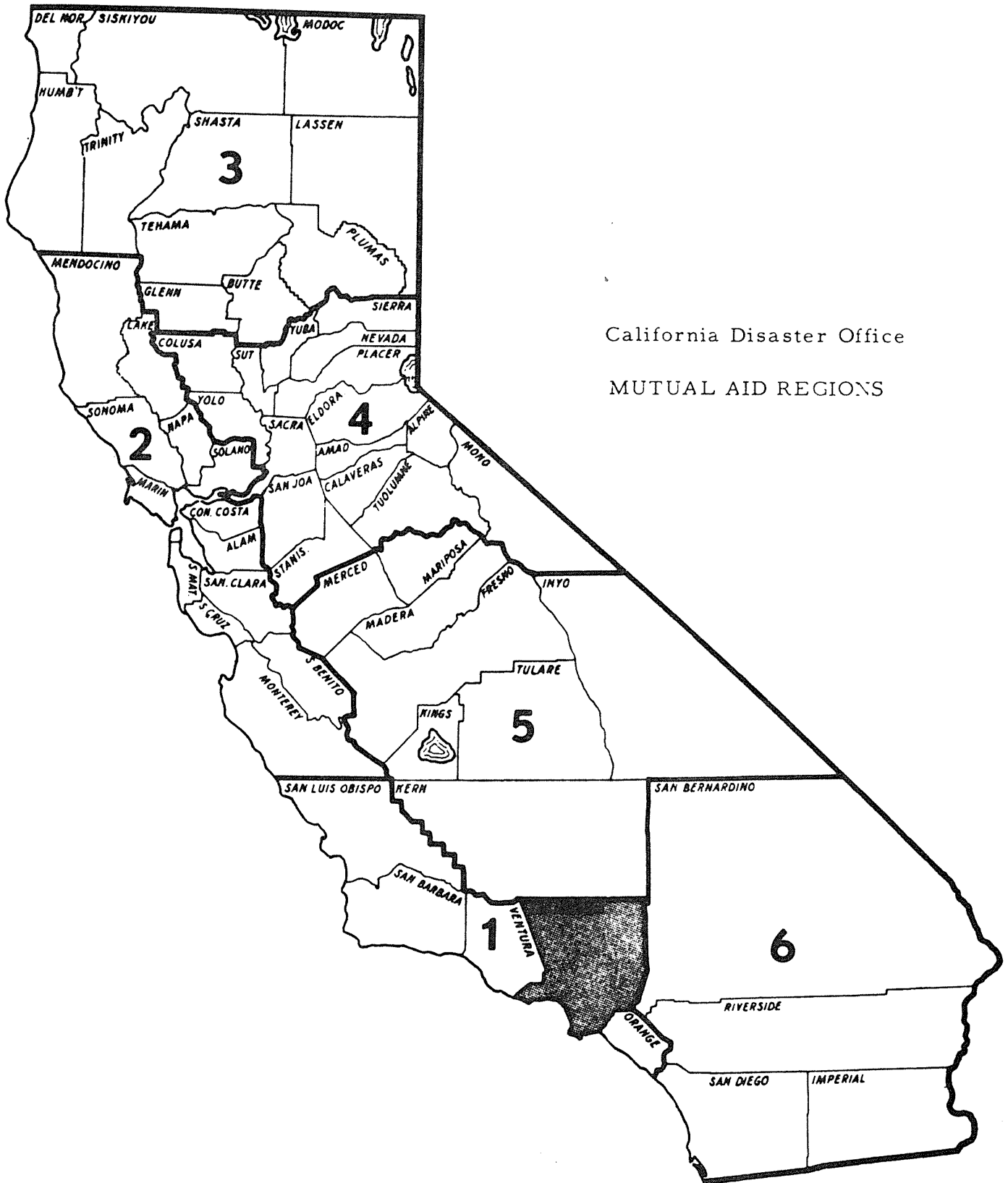
LOS ANGELES MUTUAL AID STUDY

by

T. G. Storey and C. L. Harrison

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California Disaster Office
MUTUAL AID REGIONS

I THE STUDY AREA--LOS ANGELES COUNTY

Development of workable guidelines for handling fire situations following a nuclear attack requires a study of mutual aid and command arrangements for peacetime fire emergencies, now in operation in several sections of the United States. In a nuclear disaster, these mutual aid systems would provide the foundation for a coordinated national fire control program.

One of the systems selected for study is the Los Angeles system, reputed to be one of the most advanced in the nation.

The nucleus of the system is contained in Los Angeles County, a 4,060-square mile area with a population of 1,487

people per square mile. Because of the influence exerted upon the county control system by fires in surrounding areas, however, the county's actual fire control problems extend into the adjoining counties of Ventura, Kern, San Bernardino, and Orange.

Since this buffer zone surrounding the county cannot be delineated clearly (because its limits will vary with different fires, fuels, and weather conditions) the study area has arbitrarily been extended by approximately 10 per cent to embrace the zone most directly affecting Los Angeles County.

LOS ANGELES COUNTY

The county itself borders on the Pacific Ocean and extends approximately 75 miles from north to south and 70 miles from east to west. Forty-seven per cent of the county is covered by the San Gabriel mountain range which cuts diagonally across it from northwest to southeast. Nine peaks exceed 8,000 feet and one, Old Baldy, reaches a height of 10,800 feet.

Most of the county's population is packed into a coastal plain 15 to 20 miles wide, extending from the ocean to the foot of the mountains. This plain comprises 14 per cent of the county. Two valleys, San Fernando (comprising 6.7 per cent

of the land area) and San Gabriel (comprising 7 per cent), extend into the mountains from the coastal plain. The remainder of the county is sparsely settled, barren desert, lying north-east of the mountains.

The principal rivers are the San Gabriel, the Los Angeles, and the latter's tributary, the Rio Hondo. Except for brief periods in the rainy season of December to March, they are normally dry.

The 1964 population is estimated at more than eight million persons, a considerable increase from the 1960 figure of 6,038,771. It is the third largest metropolitan area in the United States, having a population greater than any one of 42 of the 50 states.

The combination of dense population, steep terrain, flammable brush, and a long fire season creates extreme fire problems from the standpoint of fire occurrences, fire control, and fire prevention as well.

The county's spectacular population explosion, which has doubled the population since 1950, continues unabated. In 1900, the city proper stood virtually alone geographically. Since then, however, a complex metropolitan area has sprung up



around the city, comprising most of the county's 78 incorporated communities plus many unincorporated communities which incorporate at the rate of several each year.

The incorporated areas continue to encroach upon undeveloped parts of the county, constantly extending the fire risk, particularly the "front country" cities along the foot of the mountains; and even within the metropolitan area, unimproved vegetated areas provide brush or grass fire situations in addition to the normal structural problems.

FIRE HISTORY

Southern California has a long fire history dating back to the first Spanish settlements. One legend vividly describes a brush fire sweeping out of the mountains and through the village of San Buenaventura, westward to the sea. Abundant fuel, coupled with a dense population, have in recent years created an explosive fire situation which is difficult to comprehend.

Large fires continue to occur yearly. In the past six years, the county had 34 fires of 1,000 acres or larger, at least one each year. Sixty-two per cent of these fires involved structures. Damage totalled 279,538 acres burned and 805 structures, the majority of them residences in the higher price

range, damaged or destroyed. Valuable watersheds also were heavily damaged.

Approximately 40 per cent of the fires and 40 per cent of the total acres burned were on lands protected by Los Angeles County. A similar number of fires and acres burned belonged to the Angeles National Forest. The structural fire problem on forest lands in Southern California is emphasized by the fact that the number of fires involving structures was almost the same for the National Forest as for county-protected lands.

In the same six-year period, the city of Los Angeles had two fires totalling 14,805 acres and involving 518 structures. The celebrated Bel Air fire of 1961 ranked second in size only to the Topanga fire which burned 8,715 acres in the City the same day.

Also during this period, the County and three of its four contiguous "buffer" counties (excepting Kern county), experienced 53 fires of 1,000 acres or larger, burning 447,838 acres and 850 structures.

FUELS

Fuels within the county are complex, involving a variety of structural and watershed or wildland fuel types, plus mixtures.

Structural fuel types which must be contended with include residential properties, municipal developments, industrial plants, oil fields, power lines, gas lines, ocean shipping installations, and other special situations.

Watershed and wildland areas contain dense concentrations of highly flammable vegetative fuels. The dominant vegetation is brush or chaparral--the dense growth of many shrub species, mainly chamise, scrub oak, manzanita, and ceanothus. These fuel types are often found immediately adjacent to residential and industrial units along streets, highways, and sidewalks, particularly in the mountainous "front country," where the steep topography accelerates fire spread and hinders access.

Brush fuel types cover about 70 per cent of the mountainous area, grading into timber at the highest elevations. While 1,096,000 of 2,605,000 acres in the county are classified as forestland, only 14,000 acres support commercial stands of timber.

The brush is good protective watershed cover and makes pleasant surroundings for homesites, but it is extremely hazardous around homes and communities. Its natural dryness,

its structure, and dense growth present a fire hazard which becomes critical during the summer and fall months, especially when the hot, dry winds blow in from the deserts. The brush can survive long periods of drought, but will become almost explosive in its flammability.

In the northeast portion of the county, extending into the desert area, grass is the principal fuel.

Of particular importance to the fire control problem is the year-long burning season. With fuels generally remaining flammable throughout the year, the fire situation may peak to catastrophic proportions at any time.

TOPOGRAPHY

The variable topography of the county contributes materially to the difficulty of fire control. The flat coastal zone is narrow and quite irregular, with mountain ranges extending like fingers into it. Extending into the ranges, on the other hand, are many valleys or narrow drainages which serve to break up the continuity of the mountainous area. The resultant sharp slopes, rapid fire spread, and generally poor access contribute to a difficult fire control situation.

The terrain of the desert area in the northeast is readily

accessible, but sparse population and soil conditions work to the disadvantage of the transportation system.

WEATHER

Even in the absence of the existing high risk and hazard, year-round weather conditions in the county would serve to create explosive burning conditions. While temperatures are not extreme, they are consistently warm and, coupled with generally low humidities and low rainfall, keep the fuels in a high state of combustibility.

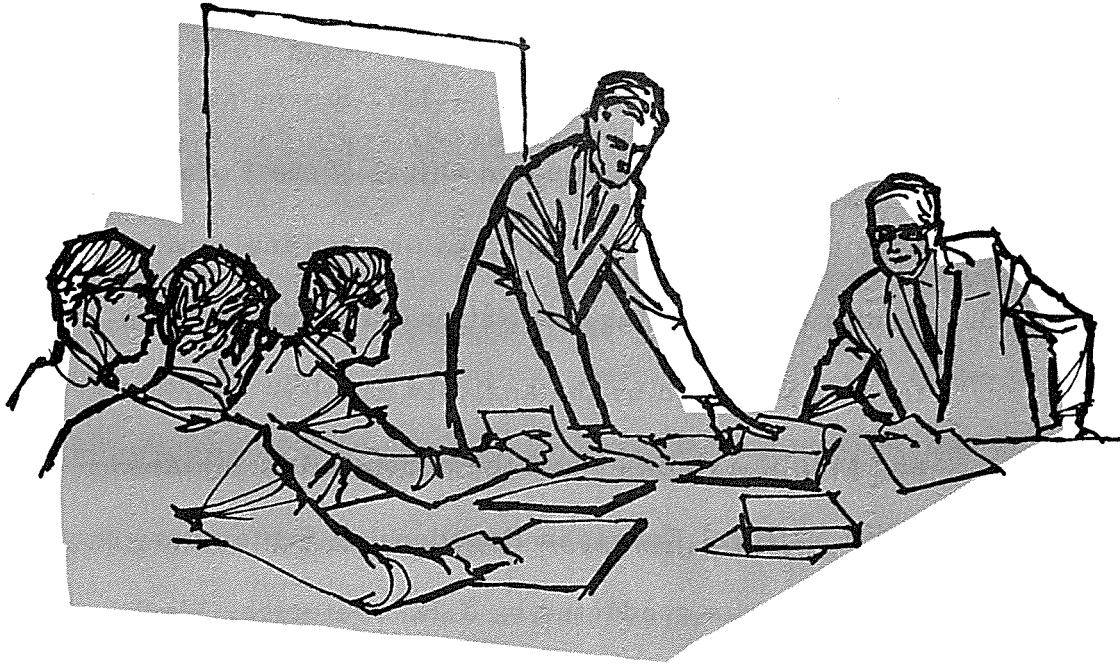
Average annual precipitation is 14.5 inches, most of it coming in the four months from December through March. It is very erratic, however, as evidenced by a total of only 4.9 inches in 1960 and 38.2 inches in 1883. Since 1952, the area has been in a general drought, with precipitation exceeding normal in only three of those years.

Since periods of precipitation do not follow a consistent pattern throughout the year, peaks in burning conditions may occur at any time. The areas of greatest precipitation are at higher elevations where the risk and hazard tend to be lower except during periods -- usually in the summer -- of heavy lightning activity, when fires occur frequently.

Wind is one of the factors creating extreme concern to the fire control organizations. Strong, dry winds from desert areas occur periodically throughout the year and fires originating at such times may be driven into the metropolitan complex with catastrophic consequences.

-
- Los Angeles County Fire Department
 - Los Angeles City Fire Department
 - U.S. Forest Service
 - Other City or County Fire Departments and Mutual Assistance Areas

FIRE CONTROL RESPONSIBILITIES
IN LOS ANGELES COUNTY



II CONDUCT OF THE STUDY

The study was conducted by T. G. Storey, of the Pacific Southwest Experiment Station, Riverside Fire Laboratory, Riverside, California, and C. L. Harrison, consultant. The study involved the following preliminary steps:

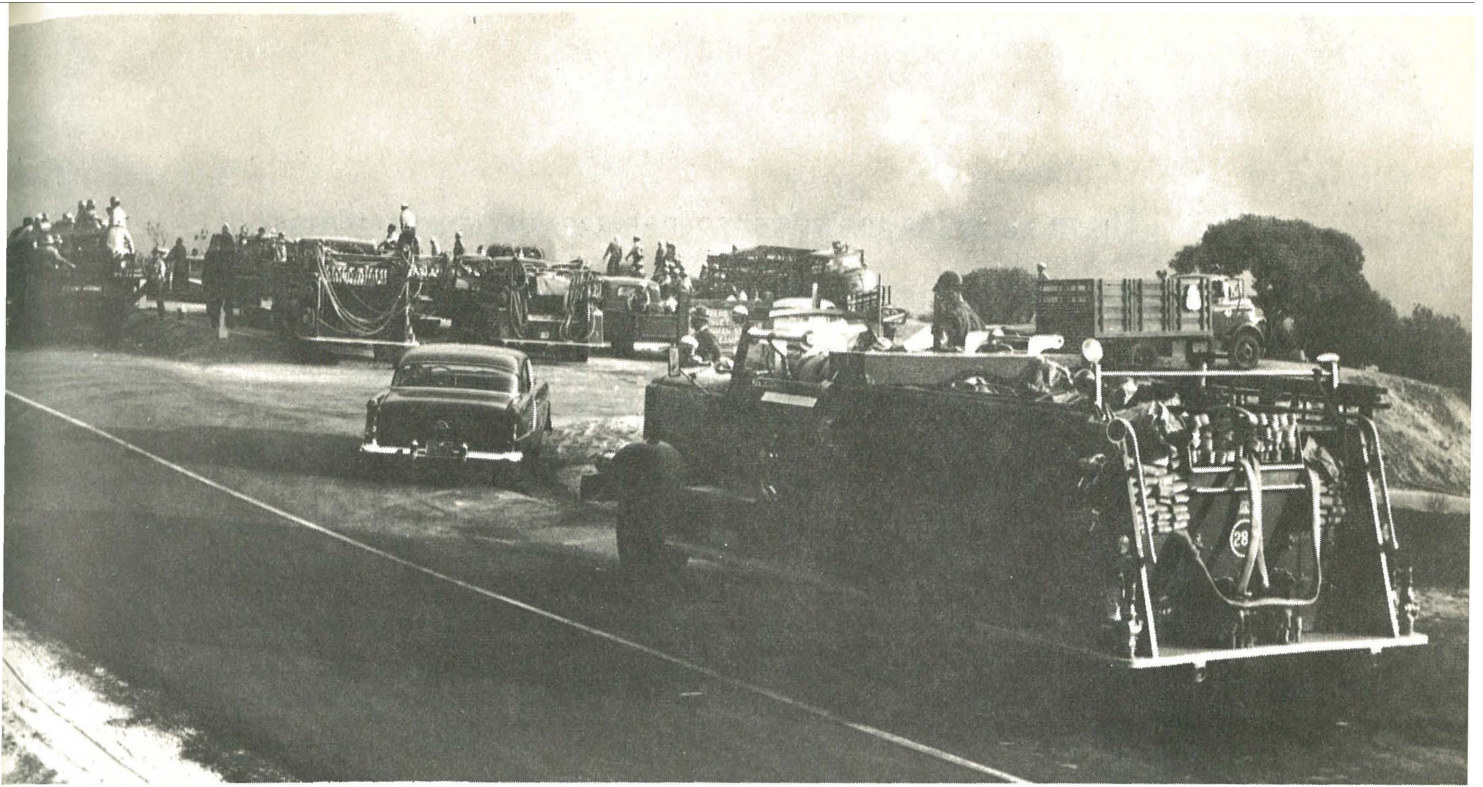
1. Local Orientation Meeting -- On June 10, 1964, a preliminary meeting was conducted in Los Angeles by the representatives of the Washington Office of Fire Control of the Forest Service, to inform local agencies of the purpose of the fire study (Project 229) and how it would be conducted.

2. Washington Office Training -- Mr. Storey attended a meeting in the Washington Office of the Forest Service August 18-19, to train project analysts.
3. Conference with Angeles National Forest -- A conference was held by the analysis panel -- Mr. Storey and Mr. Harrison -- and the personnel of the Angeles National Forest in Pasadena on September 28. This was conducted by J. H. Dieterich, Washington, D. C., a member of the 229 project. The Angeles National Forest was represented by Forest Supervisor W. Dresser and W. R. C. Beaty, Fire Control Staff Officer. The problem was developed, methods of approach determined, and decisions reached on the agencies to be contacted, organizations involved, and types of material and data to be assembled.
4. Scheduling Appointments -- Following the September 28 meeting, Mr. Beaty assisted the panel in arranging necessary interviews, which were conducted by panel members and Mr. Dieterich, working individually or as a team. Whenever it seemed appropriate,

because they were personally acquainted with interviewees, a representative of the Angeles Forest accompanied panel personnel to the interview.

5. Conducting Interviews -- Prior to conducting the interviews, the panel endeavored to study the relationship between the interviewee and the project's objective. During the interview, which covered day-to-day fire situations as well as major catastrophes such as a nuclear holocaust, the project was defined and the role of the interviewee's agency or organization in the county fire control picture was ascertained. The interview further determined how mutual aid fits into the agency's individual role and its relationships with other responsible organizations. Finally, the interviewee's opinion of the success or weakness of the present system was ascertained, and methods of improving overall results were explored. Supplemental information such as instruction manuals, maps, graphs, charts, and publications having a bearing on mutual aid and command situations were solicited.

6. Report Assembly -- Following the agency contacts and collection of related material, interview reports were assembled and analyzed by Messrs. Storey and Harrison and appropriate decisions and evaluations were made. Results of the analytical work were appraised and incorporated into this report.



III KEY POINTS IN MUTUAL AID AND COMMAND

Numerous public agencies, having fire protection responsibilities in the county or adjoining areas, influence the mutual aid and command situation. Most of these agencies have been in the fire control field for many years, and although most of them have undergone some evolution organizationally, they function generally upon the same basic principles or statutory responsibility under which they were conceived. Their functions involve not only the protection of structural improvements, but watershed and wildlands as well.

These agencies include incorporated city governments, county governments, the State, and Federal agencies.

INCORPORATED CITY GOVERNMENTS

The older incorporated cities have conducted their own fire protection with organized fire departments. Until recently, they have been largely independent operations supplemented by volunteer assistance in the event of unusual emergencies.

COUNTY GOVERNMENTS

The County of Los Angeles has been responsible for the protection of most private lands outside of the incorporated cities. The County's authority to levy taxes for this purpose was established by a state law which created the Los Angeles County Fire District. The District's organization has kept pace with the growth of the county's fire problem which has accompanied the population expansion.

As communities outside the incorporated cities grew, many have taken action to incorporate. In some cases, the articles of incorporation have spelled out the operational principles for the new city's own fire department. In cases where

fire protection was not a part of the incorporation, Los Angeles County has continued its protection.

In addition to those newly incorporated cities which never assumed their own fire protection responsibilities, certain other incorporated cities have contracted with Los Angeles County to furnish fire protection. At the present time, therefore, Los Angeles County, under a special provision of the state law, furnishes fire protection to 29 of the 78 incorporated municipalities within the county boundaries.*

The four counties adjoining Los Angeles County on the east, west, and north, are organized for fire protection under the same state law and have conducted the private land protection program for many years. Cooperative relationships along the

*Incorporated cities receiving fire protection from L. A. County Fire Department:

Artesia	Hidden Hills	Paramount
Baldwin Park	Industry	Pico Rivera
Bellflower	Irwindale	Rolling Hills
Bell Gardens	Lakedale	Rolling Hills Estates
Bradbury	La Mirada	Rosemead
Commerce	La Puente	San Dimas
Cudahy	Lawndale	South El Monte
Dairy Valley	Lomita	Temple City
Duarte	Norwalk	Walnut
Hawaiian Gardens	Palmdale	

common boundaries have gradually been developed over the years.

THE STATE

Prior to 1940, the California Division of Forestry was the only State Agency having direct responsibility for any portion of the county's fire control problem. The agency functions under broad authority permitting the Conservation Department to contract its responsibilities to other agencies while simultaneously assuming additional fire protection duties under contract with other governmental agencies.

FEDERAL AGENCIES

The U.S. Forest Service has the federal agency fire control functions within the county. The Angeles National Forest, located in the central part of the county, is responsible for 649,000 acres, most of them national forest lands. In addition, the Angeles Forest protects 42,000 acres of private land through agreement with the California Division of Forestry.

The Los Padres National Forest, with headquarters at Santa Barbara, administers 5,000 acres of federal lands along the west central portion of the county. Although this acreage

is relatively small, it brings about a working relationship between this National Forest and the County of Los Angeles.

EARLY MUTUAL AID IN LOS ANGELES COUNTY

During the early years of concurrent fire control management, numerous understandings and working arrangements were developed, to the mutual advantage of the various agencies. These arrangements resulted in overall improvement in the quality of fire control but, more importantly, they formed the base upon which the present-day mutual aid program was developed during World War II.

With the coming of the war, it was recognized that the scope of possible disasters could easily grow, affecting not only the County but the entire State. Steps were taken at the state level to develop procedures for bringing greater resources to bear upon specific problems. A committee was appointed to advise the Attorney General on the control of the fires and the conduct of police services. The committee, which became known as the Fire Services Advisory Committee to the Governor, was made up of representatives from: the National Board of Fire Underwriters; the Pacific Fire Rating Bureau; the U.S.

Forest Service; the National Park Service; the California Division of Forestry; the State Fire Marshal's office; County Fire Departments; Fire Chiefs representing paid city fire departments; and Chiefs representing voluntary fire departments.

At a later date, the California Disaster Office (C. D. O.), which included a Fire and Rescue Division, was established, and the Governor's committee became an advisory body to the Division.

With the advice and assistance of the Fire Services Advisory Council, the California Disaster Office developed the State Fire Disaster Plan, designed to establish the necessary correlation of all fire services in an emergency. With subsequent revisions and amendments, this plan has essentially provided the basis for the present mutual aid program which guides the agencies in Los Angeles County.

One of the strong features of the plan is that it establishes State, regional, area, and local responsibilities whenever emergency and disaster conditions are formally declared.

The master mutual aid agreement incorporated in the Plan, which has been approved by all of the fire services operating in the state, spells out the principles of mutual aid in local

emergencies. It also calls for local level, pre-emergency planning for individual fire services and asks local agencies to work out cooperative mutual aid arrangements with adjoining jurisdictions.

USE OF DISASTER PLAN BY FIRE SERVICES

In actual practice this mutual aid agreement is considered with extreme respect at all levels in Los Angeles County. It has become a working guide for all of the fire services in planning day-to-day mutual aid in local emergencies.

In the opinion of the Project 229 analysts, the wide distribution of this Plan, its acceptance and excellent operational basis, is the foundation for Los Angeles County's success in operating the mutual aid program. It should be pointed out, however, that the Extreme Emergency -- or top level -- of the Plan has not yet been tested.

The Fire service agencies of the County have a firm knowledge of the concept of area and regional zoning and each of them uses the plan as a channel through which mutual aid processes flow. Mutual aid needs which exceed area resources are passed from the area fire coordinator to the Region. In the case of Los Angeles County, this is Region 1, whose

coordinator is Fire Chief Keith Klinger of Los Angeles County. The Region dispatches necessary assistance, if possible, then calls upon the State if more help is needed. Area coordinators, of course, respond to requests for aid from individual fire services. Independent units automatically respond to day-to-day situations through their mutual aid understandings, but keep the fire coordinator acquainted with what is going on.

IV ORGANIZATION AND RESPONSIBILITIES

INDEPENDENT CITIES

Forty-nine of the 78 incorporated cities within Los Angeles County operate their own fire departments on an independent basis.* The organization of mutual aid for these cities was studied through a sample of six -- Los Angeles,

*Independent City Fire Departments in L. A. County:

Alhambra	El Segundo	Manhattan Beach	Sante Fe Springs
Arcadia	Gardena	Maywood	Santa Monica
Avalon	Glendale	Monrovia	Signal Hill
Azusa	Glendora	Montebello	South Gate
Bell	Hawthorne	Monterey Park	South Pasadena
Beverly Hills	Hermosa Beach	Palos Verdes Estates	Torrance
Claremont	Huntington Park	Pasadena	Vernon
Compton	Inglewood	Pomona	West Covina
Covina	La Verne	Redondo Beach	Whittier
Culver City	Long Beach	San Fernando	
Downey	Los Angeles (City)	San Gabriel	
El Monte	Lynwood	San Marino	

Volunteer Fire Departments in L. A. County:

La Habra Heights
Sierra Madre

Burbank, Glendale, Pasadena, Monrovia and Arcadia.

Los Angeles City

Los Angeles, of course, is the largest city. Four aspects of its organization were studied:

Organization and Facilities -- The city limits of Los Angeles are extremely irregular, extending northward from the coast through the county metropolitan complex and into the foothills watershed zone. This irregularity serves to involve the City in a multitude of complex fire control problems. The primary problem is structural fires but watershed and brush fire control also are important. Action in the foothills area might be classed as defensive.

The City Department follows a conventional organizational pattern. It has approximately 4,000 full-time employees. There are three divisions comprised of 17 battalions, varying in strength from a high of 244 men to a low of 139.

In addition to general administration and its related services, there are four sectional divisions of fire control, fire prevention, personnel, and supply and maintenance. Heavy fire equipment varies from nine to fifteen units per

battalion, including engines and ladder trucks. Each battalion also has a complement of equipment adapted to special situations.

While the department's annual operating budget was not ascertained, it is estimated -- based upon budget information secured from other departments -- at approximately \$100,000,000.

Training -- There is an intensive training program for both new and veteran employees which is conducted both on and off the job. There are 13 full-time training instructors with a special section for academy instruction.

Mutual Aid Agreements -- Faced with a multitude of adjoining fire departments, the city desires to stay away from the memoranda of agreements and pacts, because of duplications, probability of entanglements, financial accountability, and other complications which have been encountered over the years. In the absence of written agreements, the department feels it has been quite successful in operating through established practices, conferences, and mutual understandings of common problems. The department feels further that the master agreement contained in the

California Disaster Plan furnishes all the guide lines necessary to control cooperative relationships. All municipalities involved use this master agreement in workshops and conferences. Where written agreements do not exist, the mutual attack zone along common boundaries is naturally not spelled out, but the zone has been clearly established by mutual consent and years of common practice.

Exceptions to the above principles are the city's relationships with San Pedro, Los Angeles County, and the Angeles National Forest. Memoranda of agreement have been executed with these three fire services because certain complexities of operation have made semi-formal arrangements desirable.

The principal points of interest in the agreements with the County and Forest Service are the delineation of mutual attack zones and mutual responsibilities within them. Arrangements governing post-fire financial adjustments are spelled out.

With the exception of some special considerations peculiar to San Pedro, covered in that agreement, normal

metropolitan mutual aid can be effectively and harmoniously carried on without written documents.

Effectiveness of Mutual Aid -- Although it occasionally becomes necessary, mutual aid in structural fire situations is not a common occurrence. In the brush or watershed zones, it has become almost an annual practice in potentially disastrous situations. The department appears to feel that this is the only way to prevent fires from sweeping into its protection area from the outside.

There have been a number of major fires in the foothills area in recent years and the city has participated in all of those within its mutual attack zone. The Santa Barbara fire, some 60 miles away, was described as the most recent example of mutual aid under disaster situations. In this case, the city responded to a call for assistance from the C.D.O. Regional Fire Chief.

City authorities feel the principal reason mutual aid has become a normal part of their operating procedure is that fires of emergency or disaster consequence continue to occur at periodic intervals. They believe that these fires can only be controlled through massive cooperative attack.

Monrovia and Arcadia

The relationship between the cities of Monrovia and Arcadia was selected for thorough study because it is representative of arrangements between small cities which operate their own independent fire departments. Aspects studied include:

Organization and Facilities -- The cities are in the same area of Region 1 and have a common boundary. They also have approximately the same population -- 27,079 for Monrovia compared to 41,005 for Arcadia. Both extend into the foothill "front" zone where brush and watershed fires are common, and both have approximately the same proportion of commercial and residential structural fires. Each has interspersed undeveloped areas.

When compared with the general Los Angeles County situation, these two cities would be classified as operating small fire departments. They have four fire engines per city, operated from a common headquarters, without detached battalions. Each department has approximately 30 to 40 full-time employees. Budget figures were not ascertained.

Training -- Being relatively small, these departments face training problems which differ from those confronting larger cities. Training of veteran employees is generally confined to keeping pace with changing techniques and taking advantage of specialized training available in nearby cities. New employees undergo on-the-job training under direct supervision of experienced firemen.

From time to time, Monrovia has assigned personnel from its department to special brush fire schools conducted by the U.S. Forest Service and by Los Angeles County. This gives them additional knowledge in handling brush and wildland fires in the watershed area. The department also sends personnel to special schools such as the one on control of oil fires, conducted by the State of California.

The major universities in the Los Angeles area (University of Southern California and University of California at Los Angeles) are branching into academic courses in municipal fire control, and personnel from Monrovia and Arcadia departments have been sent to these schools for advanced training.

The Monrovia fire chief, as well as other city fire chiefs interviewed, mentioned the activities of the Greater Los Angeles Voluntary Interdepartmental Cooperation Committee which, under the chairmanship of the fire chief of Los Angeles County, was organized to develop a forum for the discussion of common fire control problems, to help break bottlenecks, and to institute overall improvements in mutual aid performance. The matter of personnel training was recently considered by a training sub-committee, which emphasized the concern of the fire chiefs for developing the full potential of their employees, both recruits and officers. Of particular significance is the preliminary study aimed at establishment of a fire training academy in an outlying area of Los Angeles County. The same project was mentioned by others as offering prospects of improving efficiency and general advancement in mutual aid accomplishments. The G. L. A. V. I. C. Committee also has active sub-committees on mutual aid, communications, and finances.

Mutual Aid Agreements -- Monrovia and Arcadia are part of a four-city compact including El Monte and Sierra Madre. Each city's responsibilities are spelled out in a memorandum

of understanding, which specifies numerous details concerning dispatch and use of equipment, and interchange of personnel. The agreement makes no effort to establish mutual aid zones and initial attack procedures. As elsewhere, these departments apparently wish to preserve their flexibility, confining solution of their mutual problems to the conference table.

Both the city of Monrovia and Arcadia have memoranda of understanding with the Angeles National Forest. Both of these agreements cover the same general problems and serve to guide initial attack action and establish zones of mutual interest. Both cities have also entered into an initial-action agreement with the Los Angeles County Fire Department.

Effectiveness of Mutual Aid -- Mutual aid action under the terms of the agreements has been rare for structural and residential fires, and has been confined largely to meeting day-to-day situations rather than emergency or disaster conditions. However, both cities have cooperated to their mutual benefit in controlling brush and watershed fires in the foothills. Four fires of major consequence, bordering

on disaster, furnish examples of the effectiveness of mutual aid. The four are:

1. The Norm Bega Fire, November 2, 1958.
2. The Monrovia Peak Fire, December 27, 1953.
3. The Gale Fire, which was a direct threat to the city of Monrovia.
4. The Glendale Fire.

In addition to these instances, Monrovia's department responded to a call for help under the mutual assistance pact for a large fire in Glendale in 1964. The cities also have cooperated in several less serious fires during the past five years.

Other Incorporated Cities

Twenty-nine of the 78 incorporated cities within the Los Angeles County area do not operate independent fire departments. In these cases, the fire control function is provided by the Los Angeles County Fire Department, which maintains one or more fire stations in each city.

In 25 cities, there is no formal written document to guide this cooperative work. Before the cities were incorporated, fire protection was a normal and independent function of the

Los Angeles County Fire District. When the cities incorporated they included in their articles of incorporation all governmental functions except fire protection; thus, the county has continued to function as it did prior to their incorporation.

At one time or another, four of the twenty-nine cities operated their own fire departments, but elected to contract with the County Fire Department for their fire protection. In these cases, a formal agreement was executed, providing an operating document between the two levels of government.

Interviews were not conducted in any of the cities where the County Fire Department acts as the fire control agency for the city. The Los Angeles County Fire Chief felt his department, as the agent for these cities, was in the best position to speak for them. The County has continued protection under its original authority without benefit of formal agreement, except for the city of Commerce, which has a written contract.

COUNTY FIRE DEPARTMENTS

County fire departments are authorized by California law to perform fire control services on all private lands not legally excluded from their responsibility. The counties have authority to enter into legal contracts to perform services for other

agencies who do not wish to organize independently. Likewise, they may contract to have other agencies perform their work if this appears to be desirable.

Funds to operate the county fire departments come from several sources. The most important is a general tax levied upon all property. Lands and property, in order to be subject to this tax, must be located within a legal fire district.

Another source is funds turned over to the county by municipalities or other agencies which have contracted for the county to do their fire control work. In addition to municipalities, the California Division of Forestry is a heavy contributor to county funds through the contract process.

Federal Clark-McNary funds may occasionally find their way into the operating budget of the counties. This would occur, theoretically at least, when the California Division of Forestry contracted with the county to protect wildlands which are the responsibility of the State Department of Forestry and for which Federal Clark-McNary funds have been provided on a matching basis.

The Los Angeles County Fire Department, with its multiplicity of mutual aid activities, is a good organization to study.

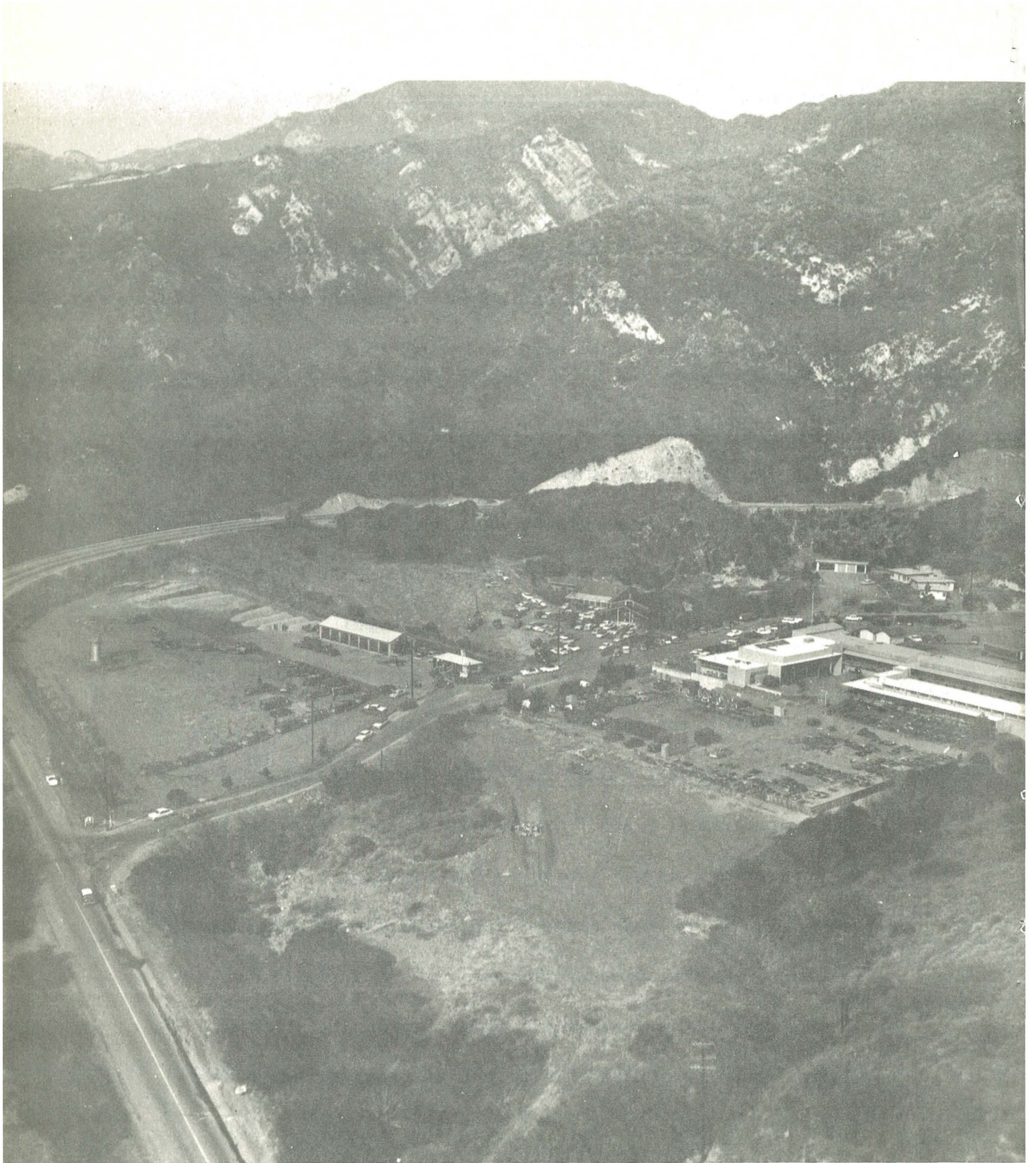
Since the county and its four adjoining counties have mutual problems, however, the organizations and procedures of Ventura and Kern counties also were studied. It was felt that their relationship with Los Angeles County would set forth the problem without a study of San Bernardino and Orange counties, where fire control problems are of less magnitude than those to the north and west.

Los Angeles County Fire Department

The fire control problems of Los Angeles County Fire Department are similar in many ways to those of Los Angeles city proper. Its responsibilities extend throughout the County and take into account a wide variety of fuel types, industrial complexes, residential areas, vegetated areas, and other elements. Study of the department develops these points:

Organization and Facilities -- The County has a total protection area of 1,385,792 acres, of which 17 per cent is covered by contract with other fire services.

Due to the wide range of fire control situations, the county has developed an extremely diversified fire control organization, which takes into account the structural fire control situation of metropolitan areas and the brush,





timber, and grass fuels of the coastal zone, foothills, mountains, and desert. It operates the conventional city fire stations, but in addition it has established permanent centers of operation in the rural areas.

The total, full-time manpower of the Department is approximately 1,800 men. Those involved in joint control work are divided into five divisions, three of three battalions each and two of two battalions. Although the exact numbers of equipment were not ascertained, it is understood that all battalions are appropriately equipped with engines, ladder trucks, and equipment for special conditions or problems.

The Forestry Division heads the watershed protection section, which supervises four correctional forestry camps with their inmates assigned primarily to fire control work. The administrative services section provides such services as supply and transportation, warehousing, and fire camp operation, including kitchens, hose repair, and blacksmithing.

The Department is supported by an annual budget of approximately \$37,000,000.

Training -- The Department operates an intensive training program for all personnel, divided into specific categories as recruit training, in-service specialized training, and camp training for both adults and juveniles. The Department is assisting in the organizing of the academy-type training institution, described earlier, which is to be supported by all fire services of the County.

Mutual Aid Agreements -- The mutual aid and assistance program is particularly important to this department, because the department's wide-spread operations bring it into contact with all of the fire services. The overall fire control situation, as developed previously in this report, points up the fact that the job cannot be done without mutual assistance. As one official stated it, "This is one big common problem and only through instant response and co-operation can disasters be managed. A fire burning anywhere in or near the county can be construed to be a responsibility of each of the fire services and a threat to all."

Memoranda of understanding, cooperative agreements, and pacts or contracts are recognized as essential. It is felt, however, that they should be used only when they are

essential legally, or to clarify fuzzy areas. It is generally felt that documented financial arrangements should be avoided except when legally required. The defining of initial attack zones and methods of response seem to be the most legitimate fields for these agreements.

Since Los Angeles County Fire Chief Klinger also has been the Regional Fire Coordinator of the California Disaster Plan for many years, he is a very knowledgeable authority on mutual aid arrangements and the workings of the system. He feels it is basic that all fire services, large and small, use the State Fire Disaster Plan and its master mutual aid agreement as their basic working document. He says that if all fire chiefs and services understand and use this plan, the need for written pacts and agreements virtually ceases. He has proposed a supplement to the Disaster Plan for use in Region 1. The County has initial response agreements with a large number of the incorporated cities; with the others it operates under terms of the Disaster Plan. The agreements generally are concerned with the watershed or brush land control area, emphasizing the establishment of mutual attack zones

and shuttling of equipment. The agreement is naturally more comprehensive than those with smaller cities.

The County also has executed memoranda of understanding with the adjoining National Forests, directed toward the usual problems of initial attack zones and interchange of manpower and equipment. They also emphasize essential financial problems which need to be predetermined.

Coordinated action is essential with surrounding counties. Working relationships with Orange and San Bernardino counties are provided under the State Fire Disaster Plan, and initial response agreements have been executed with Ventura and Kern counties. In the latter cases, more specific detail is needed than is available in the State Fire Disaster Plan. These counties have a longer common boundary and are located in areas where fire situations have been most acute in recent years.

Under a written agreement, the County has taken over a major share of the California Division of Forestry's fire responsibility within the county.

Effectiveness of Mutual Aid -- It is not possible to list

all of the examples of effective mutual aid response; such a list would include the entire history of major fires in the County and in many areas up to and exceeding 50 miles away. These fires would represent a wide spread of conditions from small fires to large conflagrations under extreme fuel and weather conditions which required gubernatorial disaster declarations. The fire chief feels there may have been a few cases where mutual aid was used excessively, but almost without exception, control would have been difficult if not impossible without mutual response.

Kern and Ventura Counties

Although not as large and complex as Los Angeles county, Kern and Ventura counties operate departments similar to it in many respects. They have the same general legal responsibilities and work with the same list of fire services. Contracting and assistance is similar in all respects. The following areas were studied:

Organization and Resources -- The detached and central fire stations of Kern County have a year-long fire force of about 400 men. Its annual fire budget is nearly \$5,000,000. Ventura's force and budget are about the same.

Training -- While their training programs were not explored in detail, both departments emphasized that training is basic to any degree of success in controlling large fires. They believe a fully trained, year-round fire control force is far superior to any principle of voluntary support of pickup fire control labor. Under a year-round employment system, both on and off the job training can be continuous.

The fire chiefs believe they have fully efficient organizations, well-trained and capable of doing their job. Results indicate this is an accurate assessment.

Mutual Aid Arrangements -- Both counties feel mutual assistance is essential and the basis for the past success in controlling large fires. They are naturally county-oriented in their thinking and place much stress on mutual attack zones along county boundaries.

Their attitude toward mutual aid agreements is similar in most respects to those of Los Angeles County. Both stress the importance of the State Fire Disaster Plan as the basic mutual aid document. They rely on it as much as possible, but spell out some approaches by

signed documents. Both have an initial response agreement with Los Angeles County and with the California Division of Forestry.

Ventura has a memorandum of understanding with both the Angeles and the Los Padres National Forests. Kern County has an agreement with the Los Padres Forest. Angeles Forest and Kern County recognize the need for mutual assistance, but since there is no common boundary, an initial attack zone has not been defined. Mutual aid does flow between the two organizations, however, either through Los Angeles or Ventura counties, which do have mutual aid assistance agreements with the Forest.

Effectiveness of Mutual Aid -- There is a long list of successful examples of mutual aid along the common county boundaries, based once again on the theory that a threat to one unit is a threat to the others. Response is instantaneous each way, and the fact that these two counties have well-trained organizations and are able to help Los Angeles County has a direct bearing upon the effectiveness of the area's mutual aid program.

NATIONAL FORESTS

The National Forest system is an important part of the fire control complex and mutual assistance program of Los Angeles County. The Angeles National Forest has the greatest influence, since it comprises the largest Federal acreage within the County. The Los Padres Forest also has a role, even though only 5,000 acres of it are within the County. The Forest has important facilities located in adjacent areas, ready for mutual aid assistance when the need arises.

The San Bernardino Forest does not extend into Los Angeles County, but its resources are made available in emergency situations, either under the terms of the California Disaster Plan or by memoranda of understanding.

Angeles National Forest

The Los Padres and Angeles National Forests have the same general organizational pattern. Since the Angeles Forest is located almost entirely within Los Angeles County and its headquarters are in the county, it was studied for an analysis of its influence on the mutual aid problems.

Organization and Resources -- The National Forest acreage in the County is 637,000 acres, 24 per cent of the county's

total. The area protected by the Forest Service within the County is 679,000 acres, including some Los Padres Forest area. The National Forest is directed by the Forest Supervisor's office, located in Pasadena. One of the principal activities is forest fire control, under the direction of the Division of Fire Control.

For administrative purposes, the forest is divided into ranger districts. There are five of these in the Angeles Forest and one in the Los Padres Forest where it extends into the County. These districts are responsible for fire control within their respective areas.

Individual district action and the role of the Forest Supervisor's office is spelled out in the Forest Fire Control Plan, a detailed volume prepared in accordance with Nationwide Manual Standards and made available at all appropriate operational levels. The Regional Office in San Francisco prepares an emergency Fire Plan for the Region each year.

The primary responsibility of National Forest fire control is protecting the National Forest lands from fire. The Angeles Forest, therefore, has no legal authority to

control fires on other lands unless such work contributes directly to the protection of the Federal forest. There may be exceptions to this restriction, however, through agreements with land owners or through funds made available to the California Division of Forestry for private land forest protection.

In addition to year-round fire control staff, the Forest Service employs crews on other forest activities. These men are available for immediate suppression work during high hazard situations and after fires have started. In circumstances where full-time crews are not sufficient to fully handle suppression, additional labor may be employed on an hourly basis.

Fire detection is performed by stationary lookout stations, ground and air patrol, and citizen reports. Discoveries are reported through a central dispatch station, where initial action is taken. Communications are by both telephone and radio; a Forest Service radio system is operated under the individual frequency assigned to it. Since the Forest Service frequency is not available to other county fire services, interagency communications are by relay or through regular telephone system.

Mutual Aid Agreements -- The National Forest organization is committed to the mutual assistance program and has found it effective for coping with the overall fire situation. Cooperative agreements and memoranda of understanding have been executed with most of the fire services. Written agreements are in existence with Los Angeles and Kern counties and with most of the cities in Los Angeles County where mutual attack zones exist.

In addition to the cooperative understandings with the fire service agencies, the Forest Service has also memoranda of understanding for special fire control work or accelerated degrees of protection for specific private installations such as the Carnegie Institute installation at Mt. Wilson, the Los Angeles Department of Water and Power, and the Southern California Edison Company.

The mutual aid agreements of the National Forest with the fire services are primarily understandings for action in mutual attack zones, interchange of personnel and equipment, and necessary financial adjustments required by regulation or law.

In fire suppression activities, mutual aid and assistance are routine, particularly in the jurisdiction of border areas for initial attack. For fires of major consequence inside the mutual attack zone, the Forest Service calls upon fire agencies for assistance if and when it is needed. In the same way, it responds to the other agencies' calls for assistance. Direct assistance is rendered on fires outside the National Forest which are a threat to federal lands. Mutual aid response is made to fires in the jurisdiction of the other fire services, even though they cannot be construed as endangering National Forest property; in such cases, the action is subject to subsequent financial adjustment.

Effectiveness of Mutual Aid -- It is the accepted opinion of Forest Service officials that adequate protection of the National Forest would not be possible in the absence of the highly developed mutual assistance program. The threat to the Forest is constant and severe. Updrafts from the coastal areas fan fires into emergency proportions within a short time. The unreserved efforts of all agencies is required if these fires are to be controlled. Examples of

effective suppression under these agreements are too numerous to mention. Although it cannot be stated that mutual aid has worked to perfection in all cases, it has generally been effective.

CALIFORNIA DIVISION OF FORESTRY

The California Division of Forestry has the primary responsibility for protecting non-Federal watershed lands in all counties. In some it provides protection services as a direct function; in other cases, it enters into agreements for the protection by counties. The Division may reimburse the county for protection costs, provide and fund to the county directly, and supervise fire control work financed by the county. In Los Angeles County, the Division's fire control responsibilities have been delegated to the county through contract. The following aspects were studied:

Organization and Resources -- The Division is regionalized and Los Angeles County is in Region 6 with headquarters at Riverside. Other counties in Region 6 are San Diego, Orange, San Bernardino, Riverside, and Ventura.

Contracts notwithstanding, the Division reserves the authority to head the fire control picture in any county and

to assist with suppression on any lands where the State has primary jurisdiction. The Division also has the authority to dispatch equipment to any fire occurring in Southern California. Since it has delegated the work, the Division does not maintain a permanent fire suppression organization in Los Angeles County.

The full equipment and manpower of Region 6 can be made available under disaster and extreme emergency conditions. This has been done repeatedly in the past and the Division of Forestry has been one of the most effective fire services in the multiple aid program. It has more latitude of movement than any of the other fire services.

Training -- Since this department does not maintain a personnel organization within the County, it does not conduct training. The organization which would be sent in to assist, however, would be trained in the department's state-wide comprehensive fire training program. Training is currently being carried on in Orange and San Bernardino counties, and in addition the Division takes advantage of organized training conducted by the State Bureau of Industrial Education and by the California Department of

Education. The Department of Education has a supervisor of fire training with assistants assigned to various sectors of the State, including two in Southern California.

Mutual Aid Agreements -- The Division of Forestry has but one cooperative agreement which affects Los Angeles County directly. This is a contract arrangement whereby Los Angeles County does the protection work for the State. It is an initial response agreement, supplemental to the protection contract.

The Division of Forestry's main entrance into the County aid program is through the California Disaster Plan. As indicated previously, the Division has the authority to enter the fire field, irrespective of the fact that its primary fire jurisdiction has been waived through contract to the County.

Effectiveness of Mutual Aid -- Since the Division of Forestry does not have initial action responsibility, it does not enter specifically into the appraisal of the effectiveness of the system. Through its observations as a cooperator, it has noted many cases of excellent results, most of which have been reported elsewhere in this report.

OTHER FACTORS

Possible Arrangements

The study did not reveal any significant segment of operation where additional major arrangements seem to be needed. Some minor details could be improved, but they are mainly operating features of present arrangements which have been touched on elsewhere.

Official consideration might well be given to making the ultimate objectives of the mutual aid system more meaningful. The fire services know their present day problems; they have been handling even "Disaster Area" fires efficiently and are trying to plan for more serious situations. It is difficult, however, to get informative thinking on what can be expected and what remedies could be taken. In other words, the fire services cannot formulate clearly in their own minds just what conditions nuclear attack or even wide-spread earthquake catastrophes would bring. The equipment, manpower, and know-how in the Los Angeles area are tremendous and have never been tapped to capacity. It would be another matter if state-wide priorities caused local areas to be seriously drained for use elsewhere, but until this actually happens, it is difficult to tell how the fire services would react.

Problem Areas

Two problem areas prevent arrangements from being fully effective:

1. Inadequate Financing -- While in most cases lack of finances has not been a serious problem, it does exist. Smaller departments which make up an important part of the mutual aid processed seldom have sufficient funds to provide more than the essentials. More funds are needed for communications equipment and heavy equipment replacement.

2. Organization and Classification -- Mutual aid is criticized in some quarters because some larger units feel the poorly financed or equipped fire services are getting a "free ride." These small-department cities call for and are given aid under the automatic response principle. These same cities respond to calls for assistance to the best of their ability, but volume-wise this is often considerably less than they have received, stimulating suggestions that only cities of the same general responsibility and resource level should enter into mutual aid agreements.

Opinions exist in various quarters that fire departments can get too big, and that small departments which cannot adequately finance themselves should contract their services to more amply-financed fire organizations.

These points have affected the attitudes of some departments, and in some cases probably have discouraged the fullest measure of mutual aid accomplishment.

Lack of Uniformity

With some 100 fire services in the mutual aid system, a multitude of different forms of agreement would be required to outline mutual aid plans in writing. Consideration is being given to some sort of simplification, directed at development of four or five standard types of working agreements within the legal framework governing fire services.

Lack of Coordination in Training

Each of the cooperating agencies is spending a great deal of money in training programs. They know their problems and are training their personnel accordingly. Equipment development and techniques of operation become more complicated year by year. Fire fighting techniques on structural and

industrial fires tend to vary. At the same time, brush, range, forest and grass fires vary in response to control methods. Many fire departments lack the necessary knowledge to use these techniques and to conduct training on them.

Centralized training of the assembled, or academy, type has been considered and steps are under way to bring it about. One of the main difficulties is that those fire departments in most need of this training will be those least able to finance their share.

SUMMARY

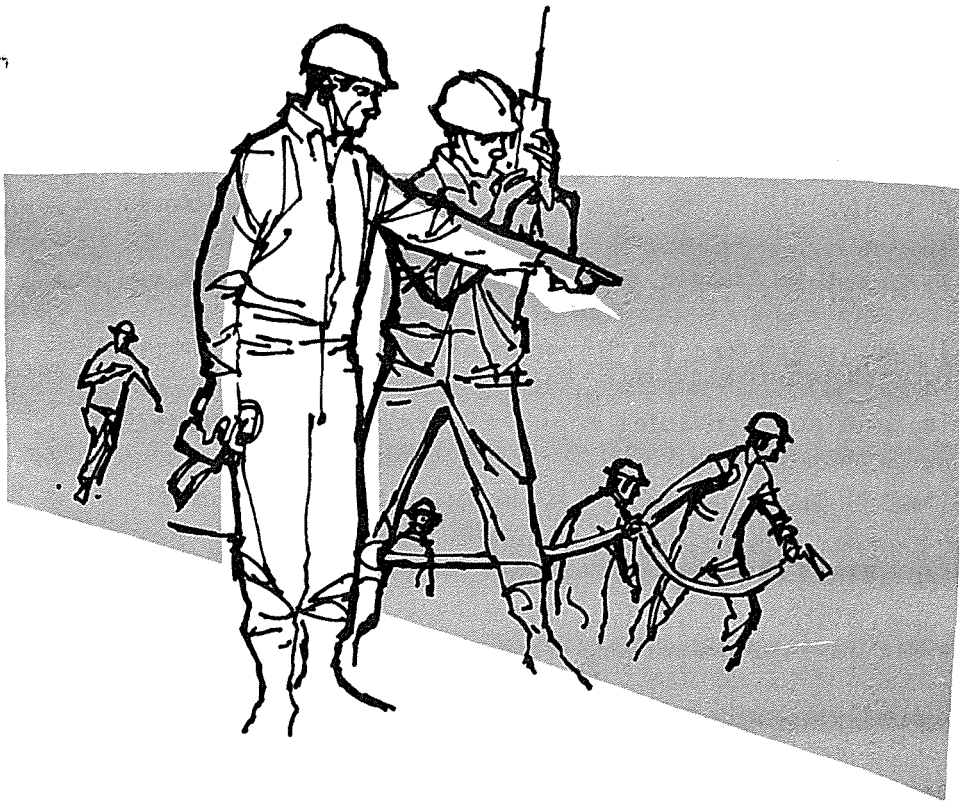
The Panel's review of the field of mutual aid failed to detect any broad gap urgently in need of filling. For the most part, the problems involve day-to-day details well within the capabilities of the services to solve. The California Disaster Office influence at the area, regional, and State levels, has caused most of these problems to come to the top and to be ironed out through comparison with practices elsewhere.

The success of the mutual aid program is probably due to the fact that all applicable fire services have already been brought into the picture. Law enforcement agencies might possibly be drawn more clearly into the processes, but from

a practical standpoint, it appears that theirs should be a supplementary function, rather than one of actual mutual aid participation.

Greater participation might be sought from industry and private citizens. Analysis indicates that private parties do enter as cooperators with some fire services; this has worked out well, but there is no move to increase this participation.





V COMMAND ARRANGEMENTS

Command situations in the Los Angeles mutual aid study area have caused little difficulty; it is one of the elements of least concern on the part of the fire services. The primary reason is that geographical boundaries of responsibility are well-defined for all of the fire services. The problem is further simplified by the fact that most geographical features fall definitely within a specific jurisdiction. As a starting point, the fire services recognize that the area in which the fire starts determines responsibility and that the ranking officer on the ground representing that service is automatically in command.

LOCATION, DUTIES AND SCOPE

With the exception of Los Angeles City, with its diversified area and responsibilities, the fire headquarters location problem is reasonably simple. For smaller municipalities, it is generally the main fire station with all of its conveniences, working tools, and supplemental support. If the city happens to have outlying stations, these may occasionally become the general headquarters on a temporary basis.

In the Los Angeles City organization, the battalion headquarters is usually considered the center of operation and direction. There have been occasions when Los Angeles City had the command for foothills and watershed fires. The exact location of headquarters in these situations was not ascertained, but if the fire service held to its expressed organization, the command post would have been the nearest battalion headquarters.

Los Angeles County generally adheres to the battalion headquarters command principle for structural fires, primarily because most of these fires fall within reasonable range of these headquarters which are well equipped to handle the problem. Officials do not hesitate to vary the procedure when fires are remote and it is decided that temporary locations would be

more effective. This concept generally governs brush and watershed fires as well, but greater variation is likely. The decision on such matters is generally delayed until the pattern of the fire begins to unfold. There have been cases of completely detached command posts in isolated positions on fires of disaster classification.

Command post arrangements for fires under the jurisdiction of the Forest Service follow the general pattern. Whenever possible, one of the developed headquarters sites is selected. On rare occasions this might be a district ranger headquarters. In other situations detached fire guard headquarters are made use of.

Under average conditions, when developed sites are not available, command posts are selected at convenient locations in the vicinity of the fire. The usual complement of field headquarters facilities are moved in and maintained for the duration of the fire. After control has been attained, the temporary command post is discontinued and activities transferred to the nearest administrative headquarters.

WHO IS IN COMMAND

The problem of selecting command has caused no particular difficulty in the past 25 years of practical experience in mutual aid assistance. The principle agreed to by the agencies is that the highest ranking officer present in the fire's jurisdiction is automatically in command. When the first fire control contingent to arrive is the cooperating agency, this contingent begins work under its own leadership. This approach to the command problem has been followed consistently over the years, in both "day-to-day" fires, "local peril" situations, and "declared disaster" situations.

The same approach is taken on major fires except that the command and staff become more elaborate. The ranking fire officer of the mutual aid assistance group becomes a part of the command staff and meets with it at periodic briefing sessions to iron out any command difficulties.

When a fire burns from its original jurisdictional area into another, the command generally shifts to that agency which has the most serious situation and probability of greatest loss. Local conditions at the time have occasionally made it expedient for command to remain the same even though the area of jurisdiction has shifted because of the movement of the fire.

A common practice when a fire is burning in two or more jurisdictional areas is for the command to assign sector or division responsibilities to the cooperating group having administrative jurisdiction over the area. These leaders in turn report to command and mutual decisions are made at briefing sessions.

When cooperating fire services have had more experience in special situations than the officer in charge, the responsibility is maintained by the command but greater reliance and latitude are allowed the specialist. For example, when structural fire people are responsible by jurisdictional areas for a fire spreading into brush and wildland situations, the key advisor to command is that officer having had the greatest amount of experience in watershed fires.

Under the California Disaster Plan, the Regional Fire Coordinator takes care of necessary correlative matters, primarily those involving equipment, but he does not assume field level jurisdiction.

THE EFFECT OF PROCLAMATIONS

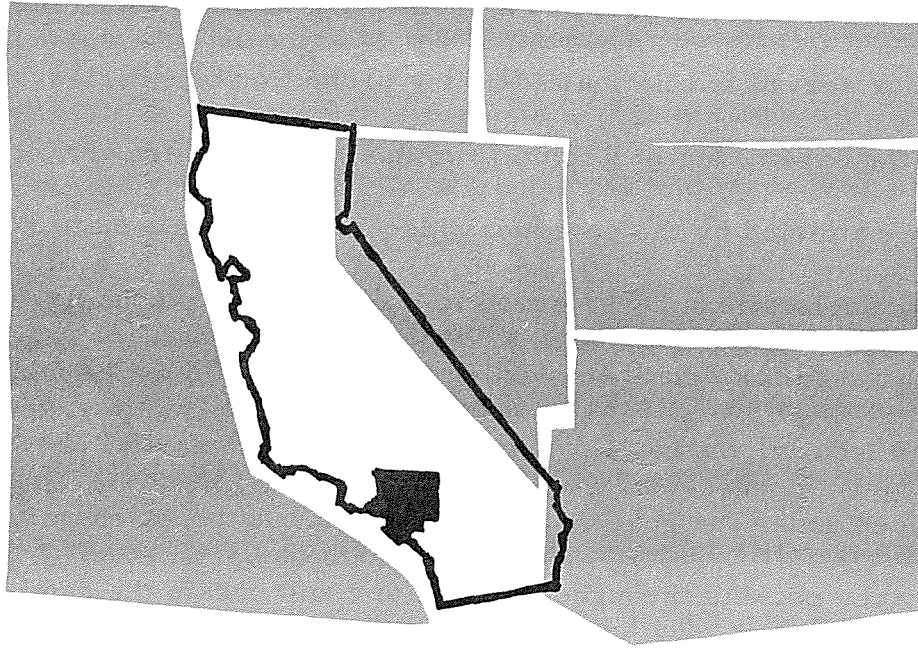
The Los Angeles County area has had considerable experience with state-declared disasters. Although such action invokes the full effect of the fire disaster plan, the California

Disaster Office has not, in the past, assumed field command. The primary purposes of the declarations have been to put the spotlight on general fire situations in this section of the State, to make it easier to bring the resources and manpower of other regions of the State into action, and to create a source for Federal funds should that become desirable. Past disaster declarations have served to make Federal funds and equipment available.

Under declared disaster conditions, the California Disaster Office has a more clearly expressed responsibility but in practice this has been confined to supervision and supply. The fire services of Region 1 recognize that there may be a time when a large-scale problem requires correlation and assignment of priorities for manpower and equipment. Under these conditions more firm direction by the California Disaster Office would be required. Even so, the agency would not involve itself in local decisions and direction.

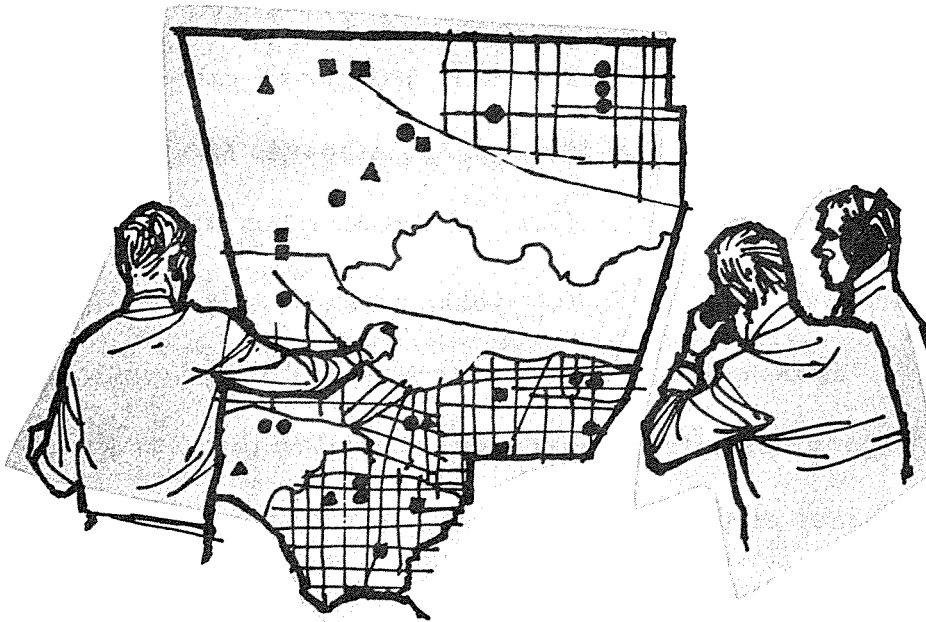
Officials realize conditions could develop so that a state of "extreme emergency" would be declared by military authorities. It is difficult to foresee what the higher level strategy would then be, but it is assumed that regional command selections would prevail.

At no time in the past has a declaration of disaster by the governor served to eliminate existing protection boundaries. From the experience of Region 1, mutual aid operations have not been affected by the governor's declaration. As a matter of fact, declarations have served to place greater emphasis upon the need for functioning under the system. So far as can be seen locally, mutual aid would function under martial law as it does under the governor's declaration. Although extreme emergency pockets throughout the State could create the need for a system of priorities, siphoning off manpower and equipment, mutual aid would still be an essential principle.



VI INTERSTATE PACTS

This study did not consider interstate pacts. Los Angeles is a long distance from the interstate boundary. It is bounded on the west by the ocean, and on the east by wide desert areas which provide good protection. The possibility of fire originating in another state and reaching Los Angeles is extremely remote. It is also doubtful if any fire originating in the county could expand to an area where interstate matters would be involved.



VII FIRE AND RESCUE RESOURCE INVENTORY

The fire equipment resources of the Los Angeles County area which can be brought to bear in the mutual aid program are tremendous. They rest in the hands of approximately 50 independent city fire departments, Los Angeles and its adjoining counties, and the State and Federal Government fire services. Each of these cooperating agencies has a record of manpower and equipment, and their location. Organization charts list equipment class, numbers of units, and area to which these are assigned or where they are located.

In addition to charts, each of the fire services has individual unit equipment boards which carry movable unit identification pieces. Some of the equipment boards are elaborate electrically-operated units, such as those at Los Angeles county and Los Angeles city departments. The Arcadia dispatch center for the Angeles Forest operates on a smaller electric board. The small city fire departments follow the same principle with less elaborate systems, often involving manually operated boards with a magnetic base. When fire dispatch occurs, the units are transferred from the reservoir board to an area representing the fire project. Subsequent changes are made by the dispatcher as the occasion requires.

CONTROL OF EQUIPMENT

Control of equipment at command posts depends upon the size and complexity of the fire, and the number of fire services responding to the mutual aid request.

The officer in charge of a contingent of men and equipment is responsible for keeping the inventory of equipment accompanying him. On the small or routine fires, no effort is made to depict the project equipment inventory graphically at the site; consultation between fire headquarters and the individual cooperators has proven sufficient.

On fires approaching disaster proportions, graphic recording at the command post is necessary. In the majority of cases, this control shows the sectors or divisions to which the individual units are assigned. With this information in the hands of the command post, equipment needs on various sectors can be met by transfers and reposting the central boards.

While there is some variation in methods used at command posts, depending upon the fire service in command, the system is generally uniform. This is because the fire services have worked together under these conditions numerous times in the past. Post-fire critiques are a normal procedure, and they are thorough and exhaustive for major fires. They develop important considerations regarding equipment control which are useful in subsequent fires.

The area and regional divisions of the California Disaster Office share the major responsibility for correlating requests under mutual aid and getting equipment to where it is needed. Neither the area nor the region maintain complete equipment inventories by specific locations, but they do know the total number of units available in each of the services.

When requests for assistance under mutual aid are received from individual fire services, the regional or area fire coordinator contacts appropriate fire services to determine what equipment is to be sent. The action is then recorded in the area or regional office so that there is a running record of who has sent equipment, how much, and where it is.

The regional fire coordinator works with the California Disaster Office in the same manner. Equipment coming into the Los Angeles mutual aid zone from this source is dispatched direct to the specific emergency and returned to its source when no longer needed; the region keeps a record of the actions.

DISPATCH SYSTEM

This equipment inventory dispatch system has been refined over the years and is exceptionally successful in the opinion of the Los Angeles County fire services. One possible weakness is that in a large percentage of cases, interagency distribution is handled at the local control level instead of by a higher echelon. The area and regional fire coordinators wish to keep it this way, however, so they will not become involved except in situations of major consequence.



VIII COMMUNICATIONS

Of all of the problems analyzed in this study, communications creates the greatest difficulties. The problem can be easily visualized when one considers that approximately 80 individual fire services are uniting their facilities for mutual action.

Each of these services has its own problems within its operating area which it has solved in its own way. It is a co-operative operation under mutual aid that creates large difficulties. The feeling exists that an ideal communication system cannot be developed, that deficiencies under the

circumstances at hand will always be present, even though some improvements can be made.

THE PRESENT SYSTEM

The telephone and radio systems in use in the mutual aid area are too extensive and complicated to list graphically. A brief description of the basic system used by the cooperating services gives the essential working plan.

Independent Cities

The average independent city, in addition to its telephone system, operates its radio net on one or two assigned frequencies, with the usual fixed stations and radios in mobile equipment. Additional portable sets may be available for loan to cooperating services operating under mutual aid.

There are cases where three to four closely associated small cities operate on a single frequency. These cities also have pack sets which can be loaned to adjoining fire services to establish inner-communication during mutual aid operations. This is particularly true in the brush and watershed fire areas where communications with the U. S. Forest Service and Los Angeles County are essential.

The independent cities in which the fire chief acts as area coordinator operate a more elaborate and diversified system. Pasadena is an example; it has two assigned frequencies of its own and a base station on the California Disaster Office net which provides correlation under mutual aid circumstances. Its contact with other cities and fire services is by telephone.

Los Angeles City operates about the same as the other independent cities except it has a direct telephone line connection with Los Angeles County.

California Disaster Office

The California Disaster Office communicates with the Los Angeles area, through its own radio network. The network is also available to the State Fire Marshal and to the California Division of Forestry for correlative purposes and where their own facilities are overloaded.

The C.D.O. network has 76 base stations, eight of them in Los Angeles County. The primary purpose of the base stations is to connect the area fire coordinators with C.D.O. in Sacramento and with the Los Angeles County Fire Department, which is the headquarters for C.D.O. Region 1. In addition to the 76 fixed stations, the C.D.O. operates 25 mobile units.

One of these is assigned to Los Angeles County as an operating facility of the Regional Fire Coordinator's office. It is equipped with all of the necessary frequencies to communicate with the fire services of the area involved in mutual aid. In addition to State funds approximately \$1,000,000 of Federal financing reportedly was advanced to develop this system.

Los Angeles County

In addition to regular telephone service, the Los Angeles County Fire Department maintains a direct line with Los Angeles City and the U. S. Forest Service dispatching headquarters at Arcadia. This office operates a monitoring service for all radio messages coming through it by Los Angeles County, U. S. Forest Service, the City of Glendale, and several other large mutual aid cooperators. Three radio frequencies have been assigned to it; two are in day-to-day use while the third is reserved for disasters.

The California Disaster Office has assigned one of its five mobile communications vans to Los Angeles County to use in connection with the regional fire coordinator's office. The unit is equipped to receive and send on the frequencies of all the major agencies. It was put into use under disaster conditions during the summer of 1964.

California Division of Forestry

Los Angeles County is in District 6 of the California Division of Forestry, but the Division does not maintain any fixed radio base stations in the County. Its basic communication plan for Los Angeles County is composed of:

1. A tie-in to the C.D.O. network as a means of relieving the department of some of its traffic during the overload periods.
2. Its mobile equipment units, which all have radio sets operating on their frequencies. These are habitually sent into Los Angeles County when they are operating under the mutual aid program. The Division is represented on all the fires of consequence, so that an outlet to the regular network of District 6 is established.
3. Commercial telephone.

Angeles National Forest

The Angeles National Forest operates a radio net to all of its fixed administrative points, and all essential fire stations, including the dispatching installations at Arcadia. All automotive and air equipment have facilities to receive and send messages.

In addition to radio, the fire control organization uses the telephone. The Arcadia dispatch center has a direct line to Los Angeles County and general telephone service is used to all other mutual aid services.

EFFECTIVENESS OF THE SYSTEM

Within the limits imposed, the communications system is as effective as can be expected. It is fully effective for any one of the fire services working alone, but difficulties arise when many different frequencies arrive at a fire without the ability to communicate direct with cooperators.

IMPACT ON OTHER ACTIVITIES

Maximum use of radio and telephone communications during the period of active burning creates an impact on other traffic. This is true not only of communications. During such emergencies manpower, transportation, and other resources are tied up, curtailed, or eliminated. All mutual aid fire services recognize this. The answer seems to be in better correlation and elimination of minor matters from the traffic.

STRONG POINTS, WEAK POINTS, AND PROBLEMS

The strong points of the present communications system are:

1. Both telephone and radio are available in the area and strong messages can be conveyed to every point.
2. Each of some 85 fire services has a heavy investment in communications equipment, all of which is superior in quality and quantity. The resources are at hand; it is a question of making the most effective use of them.
3. With the equipment at hand, each fire service, when working by itself, is adequately serviced for its own needs.
4. The essential messages do get through.

The primary weaknesses in the present system seem to be:

1. The combined system under mutual aid functions largely as an individual agency facility rather than one of unity.
2. The system, if unitized, would still not be geared to handle the volume of traffic that is essential on fires approaching disaster size. The solution seems

to lie as much in the field of organization as in communication improvement and development. There are examples of progress toward the solution of this matter. It has become standard practice on fires of consequence, for instance, for the cooperating fire services to send communications liaison officers to each fire, so that they can receive and relay messages to the proper agencies' frequency. Various correlation and coordinating committees of the mutual aid agencies have communications sub-committees studying the problems and making recommendations for improvements.

3. Use of tone equipment and other devices serving to open one frequency for the reception of another are beginning to enter the picture. But even if this innovation were fully developed, it could be an expensive proposition to replace equipment now in use.

4. The California Disaster Office is taking the lead in establishing a hardened communications center on the Angeles National Forest in Los Angeles County. This installation is being readied in a former Army

missile base, in cooperation with the California Division of Forestry and Los Angeles County. The base will be equipped with operating equipment for all major frequencies and will be in position to receive and relay all messages. This will be helpful, but it will not solve many of the problems existing at command posts.



IX THE EXISTING CIVIL DEFENSE ORGANIZATION

The Fire and Rescue Services of California Civil Defense are handled in the Fire and Rescue Division of the California Disaster Office. The division's functions also include police services.

The agency has an advisory council known as the Fire Advisory Committee, composed of representatives of all agencies involved in the mutual aid program.

The radiological monitoring responsibility is lodged in a separate division which supervises and directs the monitoring system in the State. Heavy reliance is based upon cooperating

agencies. Readings from 6,900 stations come into the State office, where they are appraised and evaluated. The general situation rather than specific readings is then returned to the fire agencies.

The Fire and Rescue Division was studied from the following standpoints:

Organization -- The division has nine employees -- the chief, one stenographer, five field representatives, and two mechanics. This group serves as correlators and expeditors for seven regions, each of which is headed by a regional fire coordinator -- generally a fire chief of one of the larger fire departments of the region.

Each region is broken down into areas, each headed by an area coordinator who is a chief of one of the fire departments. Area coordinators are chosen by their fellow fire chiefs, and regional coordinators are chosen by the area coordinators.

Functions and Services -- The function and services of the Fire and Rescue Division are:

1. The Division is a source of supply for the fire services operating through the mutual aid program. The supplies obtained are principally surplus government

materials, heavy fire-fighting equipment, special equipment such as six-inch water conduits, and other miscellaneous items needed by mutual aid agencies which are available through surplus. Approximately 110 C.D.O. pumpers are based at local fire stations throughout the State.

2. The Division operates through the California Disaster Office radio communications network, which carries not only C.D.O. business but overload from the California Conservation Department and the State Fire Marshal.

3. The Division equips and furnishes the services of special mobile radio units, which are assigned directly to the various regions.

4. The Division supplies other specialized equipment, such as rescue units, which are also operated by the regions to which they are assigned.

5. The five field officers of the Division serve as service and equipment coordination advisors to the regional and area fire coordinators. The regional coordinator for Region 1 is the fire chief of the Los

Angeles County Fire Department, the key man in the Los Angeles County mutual aid system.

6. The Division assists in fire suppression and supervision when C. D. O. equipment is placed in operation.

7. The Chief of the Fire and Rescue Division in Sacramento becomes the governor's representative for fire matters once an area has been declared a disaster by the governor. His specific function in this capacity is advice and service to the regional coordinators, rather than command.

COMMAND CENTERS

C. D. O. does not operate command centers as such. The field staff does have office headquarters, but their work is service and advice to the regional fire services, rather than command.

C. D. O. AND LOCAL SYSTEMS

The C. D. O. organization's function, through the mutual aid levels of "day-to-day" and "local peril" situations, is that of advice, supply, and service through the regional mutual aid fire

coordinator to the area coordinator and the individual fire chief.

This same general type of organization and service has in the past been supplied by C.D.O. for State-declared disaster areas. Under such circumstances, however, the Fire and Rescue Division becomes the governor's representative for contact and field operation.

It would serve the governor in the same way in military emergencies.

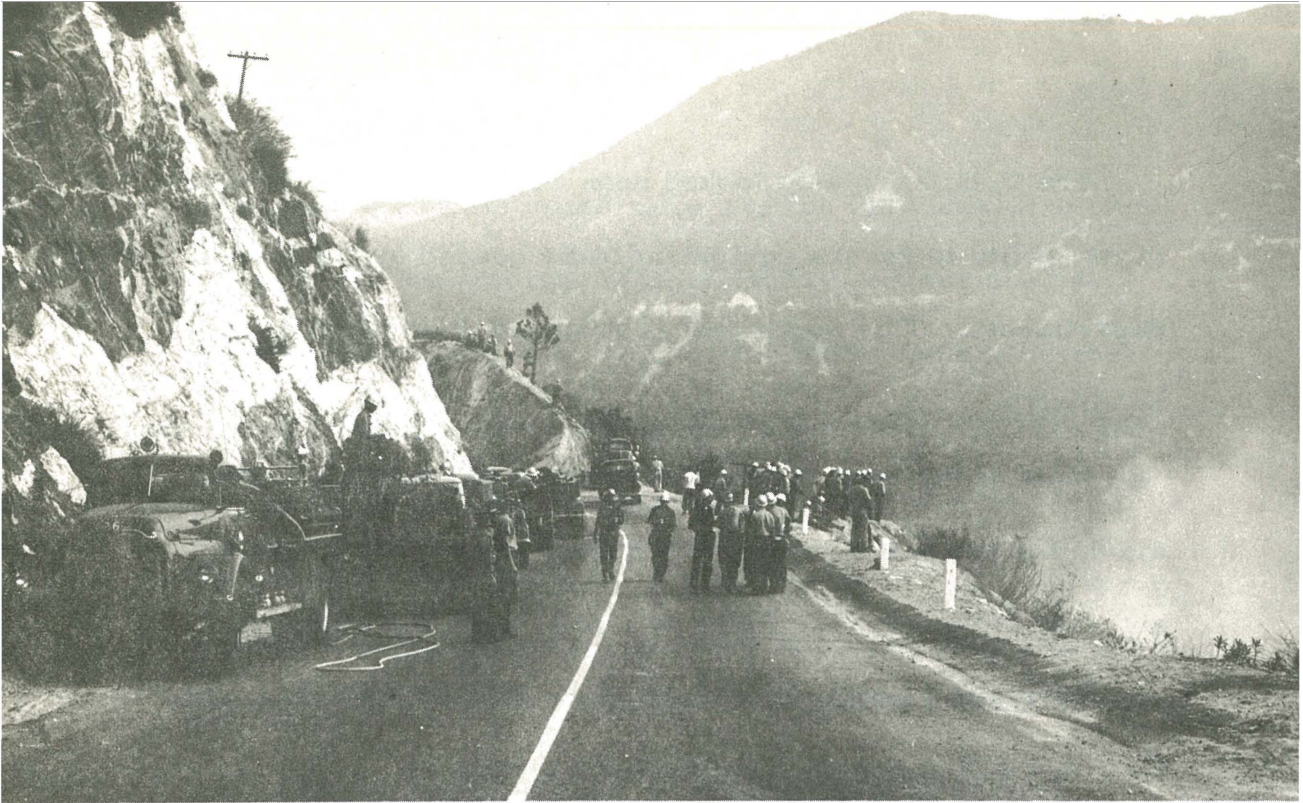
In either declared disasters or extreme emergencies, priorities by areas might have to be established; if so, they could call for the siphoning off of manpower and equipment to go to other areas of the State. Should this eventuality arise, this office of the State government would make the necessary judgment.

PUBLIC AND FIRE SERVICE APPRAISAL OF C.D.O.

The policies of the C.D.O. as reflected by the California Disaster Plan are highly regarded by mutual aid fire services in the Los Angeles area. It is felt that this has been a key to the success of the program since it forms the basis for effective correlated work which could not be achieved any other way.

The C.D.O. is also looked upon with high regard because of its ability to secure equipment badly needed by the local fire departments. This equipment is assigned directly to the departments.

Most of the local fire services operating through mutual aid do not and would not look with favor upon C.D.O. taking any part in command. There is a reluctance to relinquish command and a feeling that local experience is the best quality for command under the specific jurisdiction.



X CONCLUSIONS

The study panel has come to the following conclusions:

1. Mutual Aid in the Los Angeles area, as in all of California, is a child of necessity, sound in principle and exceptionally well adapted to the local problem. Both its strengths and weaknesses lie in the vast number of fire services involved in the program, but the organization is being perfected by continual practice.

2. Mutual Aid is not a common practice in structural fires but is frequently employed in natural fuel fires. Because of the peculiar makeup of the area, any fuel fire within

a wide radius is a threat to all communities within the radius. Jurisdictions, for their own safety, must often extend fire protection to neighboring areas. Adequate protection of any jurisdiction would not be possible without mutual aid.

3. Success of Mutual Aid in the area is due in a large degree to the fact that assistance is rendered automatically, and not subsequently billed for by the assisting agencies. The liberal policy regarding reimbursement should serve as a guide to similar mutual aid programs.

4. Mutual Aid has achieved results beyond expectations under exceedingly complicated and trying conditions. The mechanics of the program are worthy of consideration for adaptation to mutual aid programs elsewhere, and in National planning. Affected fire services accept the need for a mutual aid program, have the necessary resources, and are prepared to seek enabling legislation when necessary.

5. Formal Agreements are used only when necessary; they are generally avoided because of the possibility of legal entanglements and the number of pacts required. Most fire managers believe they are not handicapped without them; they have found that normal mutual aid can be effective and harmonious without written documents.

12. Nuclear Fire Training is not being undertaken in the area.

13. Planning for a large-scale disaster is non-existent. While nuclear disaster is recognized as a possibility, there is little comprehension of its magnitude or its impact on fire control forces.

14. Familiarity with Mutual Aid and Disaster Plans exists in proportion to the frequency of the plans' use.

15. Personal Liability Laws protecting the fire services during mutual aid operations are obscure and inadequate. They are a deterrent to all-out response to requests for aid. The present study should point the way to improved legislation.

16. Watershed Areas with their flammable fuels and steep terrain, are a major fire hazard to urban areas.

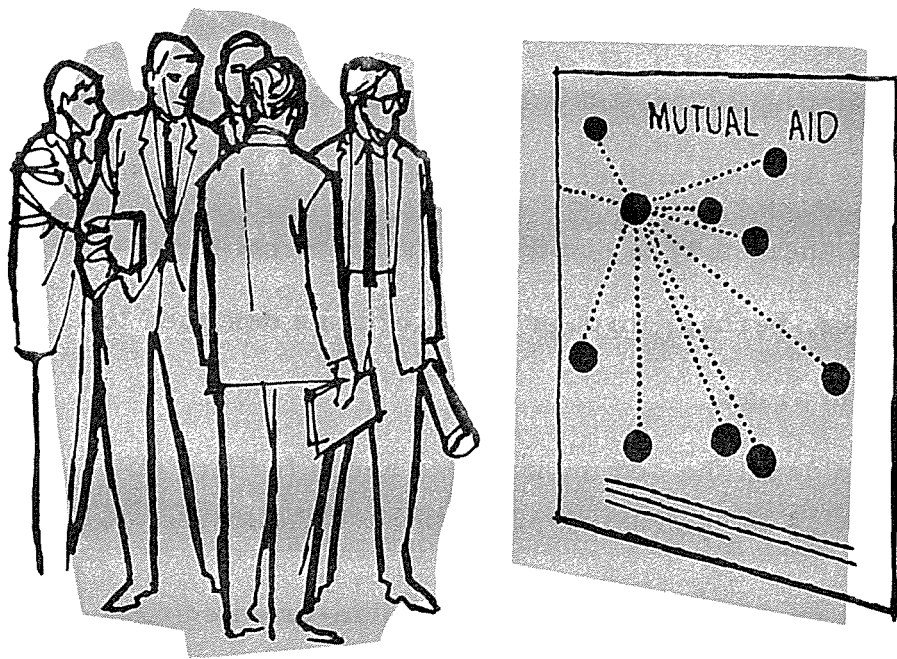
17. Expanding Residential Areas in the foothills, which abound in highly flammable fuels and disaster-type fires, complicate mutual aid. As more homes are built, the risk increases. Local ordinances have not solved the problem.

18. County-wide Fire Departments with responsibility for both rural and urban fires present many advantages in planning to meet the nuclear fire problem. Their planning for

such disasters, however, must not be confined to their own counties.

19. Optimum Size of fire departments is not known.

Many small cities cannot seem to afford adequate departments but can contract for sufficient protection from adjacent jurisdictions. The Los Angeles county-wide department, with its central dispatch, is effective. A study in depth could provide needed guidelines for numerous other sprawling metropolitan areas.



XI RECOMMENDATIONS

The following recommendations are directed to any organization or individual with responsibilities in the field:

1. Encourage mutual assistance arrangements as being essential to effective fire suppression, particularly in a nuclear fire threat; provide model multi-party mutual aid agreements for guidance.
2. Clarify the liability of the fire services in mutual aid situations under existing State and Federal laws, and seek revision of the laws if necessary to provide adequate protection; encourage liberal policies regarding reimbursement for mutual aid.

3. Suggest that any group considering establishing, adapting or supplementing mutual aid programs, make a thorough study of the Los Angeles mutual aid situation.

4. Give further study to command arrangements for disaster conditions, perhaps through test exercises designed to pinpoint problem areas.

5. Study in depth the communications needs for fire disasters, and develop model communications plans.

6. Support joint training which is problem-oriented to the nuclear fire threat; since fire services which fight fires together should train together, encourage individual fire services to participate in planning and directing the disaster training program.

7. Encourage the fire services to participate in the preparation of all plans which affect them.

8. Accelerate research on hazard reduction in watershed areas; include fuel-type conversions, fuel treatment and fuel-breaks.

9. Accelerate study and research in the field of populace regimentation, building and area development codes, and other risk reduction measures.

10. Study in depth the size, organization, and equipment complement of existing effective fire departments; develop guidelines for the optimum size and specifications for fire services to meet today's problems.

APPENDIX I

"FOUR CITY" MEMORANDUM OF UNDERSTANDING

ARCADIA
EL MONTE
MONROVIA
SIERRA MADRE

MUTUAL AID AGREEMENT FOR FIRE PROTECTION

THIS AGREEMENT, made and entered into this 5th day of APRIL, 1960, by and between the CITY OF ARCADIA, the CITY OF EL MONTE, the CITY OF MONROVIA, and the CITY OF SIERRA MADRE, each being municipal corporations organized and existing under and by virtue of the laws of the State of California,

W I T N E S S E T H :

WHEREAS, the parties hereto are geographically located in proximity to each other in the County of Los Angeles; and,

WHEREAS, it is to the mutual advantage and benefit of the parties hereto that each of the parties hereto agree to render to each other supplemental fire protection in the event of a fire or similar local emergency of a magnitude that has developed, or appears to have developed, beyond the control of a single party hereto and therefore requires the aid of one or all of the other parties hereto;

NOW, THEREFORE, in consideration of their mutual covenants, the parties hereto agree as follows:

1. That in the event of any fire or similar local emergency which cannot be handled by the facilities of any one of the parties hereto, the other parties hereto agree to furnish aid to the party requesting it, either upon an active or upon a standby basis, in handling such fire or similar local emergency. The extent of aid to be furnished under this agreement shall be determined solely by the party furnishing such aid. It is further agreed that the aid so furnished may be recalled at any time at the sole discretion of the party furnishing the same.

2. That details as to method of requesting mutual aid and the names of persons authorized to send and receive such requests, together with lists of equipment and personnel which will be subject to call, will be covered by correspondence between the parties from time to time.

3. That all personnel furnished hereunder shall be under the direct command of the ranking officer of the party receiving such personnel, subject only to the authority of the ranking officer of the party furnishing such personnel to withdraw the same at any time. That all equipment furnished hereunder shall be under the general direction of the party requesting the same, but the party furnishing the equipment hereunder shall have the unconditional right to operate such equipment by its own personnel and to withdraw the same at any time.

4. That no party to this agreement shall be required to pay any compensation to any other party to this agreement for services rendered hereunder, the mutual advantages and protections afforded by this agreement being considered adequate compensation to all of the parties.

5. That each party hereto shall provide for its employees who render assistance hereunder all benefits to which by virtue of their employment they are entitled while working within the jurisdictional area of such party.

6. That any damage sustained by any equipment furnished hereunder shall be borne by the party furnishing such equipment. That any injuries sustained by any personnel furnished hereunder shall be the responsibility of the agency furnishing such personnel. That any injury to persons or property caused by equipment or personnel while en route to or from a destination for which aid has been requested hereunder shall be the responsibility of the agency furnishing the personnel or equipment hereunder. That any injury to other persons or damage to other property caused by any equipment or personnel after arrival and while under the direct command or orders of the party receiving aid hereunder shall be the responsibility of the party receiving equipment or personnel hereunder.

7. That this agreement shall not be construed as, or deemed to be, an agreement for the benefit of any party or parties not a party to this agreement. No party or parties not a party to this agreement shall have any right of action hereunder for any cause whatsoever. Any services performed or expenditures made in connection with furnishing assistance

under this agreement, by any party hereto, shall be conclusively deemed to be for the direct protection and benefit of the inhabitants and property of such other parties hereto.

8. That the provisions of this agreement will be invoked only when in the opinion of the Fire Chief of the City requesting aid it is deemed necessary to request outside assistance because all of the normal facilities at his command have been or will be exhausted, and outside assistance is needed for standby purposes and/or to control and suppress a fire or other local emergency.

9. That this agreement does not relieve any of the parties hereto from the necessity and obligation of providing adequate fire protection within their own areas, and each party hereto agrees that it shall use reasonable diligence in keeping the fire-fighting equipment in its possession up to the minimum peacetime standards and requirements established by the National Board of Fire Underwriters for cities of comparable size.

10. That any party to this agreement may withdraw at any time, upon thirty (30) days written notice to each of the other parties, and thereafter such withdrawing party shall no longer be a party to this agreement; but in event of such withdrawal this agreement shall continue to exist among the remaining parties.

IN WITNESS WHEREOF, this agreement has been executed on the day and year first above written by the parties hereto, through their respective mayors, first thereunto duly authorized by their respective city councils.

Mayor of the City of Arcadia

Mayor of the City of El Monte

Mayor of the City of Monrovia

Mayor of the City of Sierra Madre

APPENDIX II

MEMORANDUM OF UNDERSTANDING

LOS ANGELES COUNTY - ANGELES NATIONAL FOREST

F

COOPERATION
Los Angeles County
Fire Department

MEMORANDUM OF UNDERSTANDING
BETWEEN THE LOS ANGELES COUN-
TY FIRE DEPARTMENT AND THE
ANGELES NATIONAL FOREST

WHEREAS, There are privately owned lands situated within the boundaries of the Angeles National Forest that have been or may be annexed to the Los Angeles County Fire Protection Districts;

AND, WHEREAS, it is the responsibility of the Los Angeles County Fire Department to protect and furnish fire protection to all property within such districts;

AND, WHEREAS, Agreement A5FS-6561 County No. 317-W between the County and the Forest Service makes no provision for interdepartmental relationships in the protection of these lands;

NOW, THEREFORE, it is agreed between the Supervisor of the Angeles National Forest and the Chief Engineer of the Los Angeles County Fire Protection Districts that the following action will be taken:

The Los Angeles County Fire Department will:

1. Conduct all the fire prevention activities within the boundaries of the Fire protection districts, including inspection, patrol, and law enforcement to prevent fires.
2. Assume responsibility for the control of fires within said district, including all cost of fire suppression.
3. With local U. S. Forest Officer in the area make periodic joint inspection and prevention patrols.
4. Issue burning and blasting permits as necessary within the district and notify the Forest Service dispatcher of such action.
5. Notify the U. S. central dispatcher of all responses within the area involved inside the forest.
6. Furnish the U. S. central dispatcher copies of fire reports covering all fires within the area involved.

The U. S. Forest Service will:

1. Cooperate in the fire prevention activities within the Forest on a Mutual aid basis.
2. Respond at their own expense to fires within the area when necessary to protect National Forest Land within or adjacent to the boundary of the district.
3. Provide mutual aid in suppressing fires within the fire district when requested by the County Fire Department.
4. Furnish the Los Angeles County Fire Department copies of such reports as are made covering fires within the said fire protection district.

APPROVED:

/S/ Wm. V. Mendenhall DATE: 4/20/56
Wm. V. Mendenhall, Supervisor
Angeles National Forest

APPROVED:

/S/ K. E. Klinger DATE: 4/27/56
K. E. Klinger, Chief Engineer
County Fire Protection Districts

APPENDIX III
DEPARTMENTAL STATISTICS
COUNTY OF LOS ANGELES FIRE DEPARTMENT

DEPARTMENTAL STATISTICS
County of Los Angeles Fire Department
July, 1963

STATIONS:

In Service	106
Proposed	18

APPARATUS IN SERVICE:

Engines	122
Trucks	7
Rescues	21
Reserves	26
Watershed Engines	10
Aircraft Crash and Rescue	1
Office of Civil Defense Engines	2
Patrol Pumpers	41
Reserve Patrol Pumpers	5
Training Engine	1
Helicopters	4
Fixed Wing	6
Resuscitators	106
Miscellaneous	<u>237</u>
TOTAL APPARATUS IN SERVICE	585

TOTAL PERSONNEL	2,224
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TOTAL COUNTY AREA	4083.21 sq. mi.
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AREA SERVED BY DEPARTMENT	2165.35 sq. mi.
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REFERENCES

ADDRESS -- Keith E. Klinger, Chief Engineer, County of Los Angeles Fire Department, before University of Maryland National Fire Service Staff and School: "Centralized Command and Functional Control," 7-22-64.

AGREEMENT: City of Arcadia -- U. S. Forest Service.

AGREEMENT: City of Monrovia -- Los Angeles County

AGREEMENT: Form of Agreement used between State and County (including Los Angeles) whereby County provides protection.

AGREEMENTS: Los Angeles County -- Angeles National Forest
-Agreement of July 22, 1941
-Amendment to Agreement, March 2, 1944
-Memorandum of Understanding in Reference to Air Tankers -- not dated

-Mutual Aid Agreement reference Production Flight
Test Installation A.F. Plant 42, October 26, 1963.

CALIFORNIA Disaster Plan.

COOPERATIVE Agreement: Ventura County -- Angeles
National Forest, 7-14-39.

EMERGENCY Fire Plan -- Region 5 -- U. S. Forest Service,
Season, 1964.

INITIAL Response Agreement -- Kern County - Los Angeles
County.

INTERVIEW NOTES:

- California Disaster Office, Sacramento Headquarters,
Fire and Rescue Division -- Bowhey
- California Division of Forestry, District 6, River-
side; Assistant Deputy State Forester Schori
- California Division of Forestry, Sacramento Head-
quarters; Deputy State Forester (Fire Control) Has-
tings

- City of Arcadia (Chief Way)
- City of Burbank (Chief Taylor)
- City of Glendale (Chief Stolley)
- City of Los Angeles (Chief Hibbard)
- City of Monrovia (Chief Becker)
- City of Pasadena (Chief Heidner)

- County of Kern (Chief Woollomes)
- County of Los Angeles (Chief Klinger)
- County of Ventura (Chief Haggard)

LOS ANGELES City Organization Chart.

MEMORANDUM of Agreement: Los Angeles City-Los Angeles
County.

MEMORANDUM of Agreement: Los Angeles City - U. S. Forest
Service.

MEMORANDUM of Understanding: City of Monrovia - U. S. Forest Service.

REPORT from the Subcommittee on Training of the Greater Los Angeles Voluntary Intergovernmental Cooperation Committee.

REPORT on the Fire and Rescue Division of the California Disaster Office. This material presented to the 1964 California Legislature by the California Disaster Office. The following pages are pertinent to this Report:

- p. 8 -- Number of Personnel
- 10 -- Fire Apparatus
- 15 -- Day to Day Mutual Aid
- 16 -- C.D.O. Radio Net
- 17 -- Mountain Top Relay Locators
- 18 -- Communications Units
- 25 -- Region I -- Base Station Equipment Tests
- 26 -- Region I -- Radio Networks
- 39 -- Rescue Units

U. S. FOREST SERVICE General Headquarters (GHQ) Organization for Large Fires.